

COLUMBARIINAE (GASTROPODA; TURBINELLIDAE) FROM QUEENSLAND, AUSTRALIA

By THOMAS A. DARRAGH

Natural History Division, Museum of Victoria, 285 Russell Street, Melbourne, Victoria 3000.

ABSTRACT: Species of Columbariinae are recorded from the Queensland Continental shelf and slope. New species described are: *Columbarium hystriculum* from north of Townsville; *Coluzea bimurata* from central Queensland; and, *Coluzea pinicola* from south of New Caledonia. Range extensions are recorded for: *Columbarium spinicinctum* (Martens); *Columbarium pagodooides* (Watson); *Columbarium hedleyi* Iredale; and *Coluzea icarus* Harasewych.

The Columbariinae (Family Turbinellidae) is a subfamily of gastropod molluscs, generally found in the deeper waters (100-1000 m) of the continental shelf and slope. Acquisition of specimens is difficult and very much dependant on specific scientific dredging programs, or fortuitous collection by fishing boats trawling for prawns. Large samples taken over a wide area are not to be expected. Since the author's last contribution to the group (Darragh 1969), dredging programs on the east coast of Australia by the New South Wales Fisheries Department, the Australian Museum, James Cook University and the Museum of Victoria, and trawling between Cape York and Central New South Wales have yielded some new material and also extended the ranges of previously-described species. Harasewych (1986) has reported on material trawled off northern Western Australia by C.S.I.R.O.

The purpose of this paper is to describe a new species of *Columbarium* from north of Townsville, two new species of *Coluzea*, one from central and north Queensland, the other from off the Isle of Pines, New Caledonia and to record range extensions for *Columbarium spinicinctum* (Martens), *C. pagodooides* (Watson), *C. hedleyi* Iredale and *Coluzea icarus* Harasewych.

Harasewych (1983b, 1986) has studied the anatomy of several species currently assigned to *Coluzea* and *Fulgurofusus* and concluded that the group, hitherto regarded as a family, should be placed as a subfamily within the Turbinellidae. This view is followed in this paper.

SYSTEMATIC DESCRIPTIONS

Genus *Columbarium* Martens 1881

Pleurotoma (*Columbarium*) Martens 1881, 2, p. 105. *Columbarium* Darragh 1969, p. 71 (synonymy and description).

TYPE SPECIES: *Pleurotoma* (*Columbarium*) *spinicincta* Martens 1881 (original designation).

Since the publication of the writer's revision of the group (Darragh 1969), the distribution of the genus in the Western Pacific has been extended. Habe and Kosuge (1972) described a new species, *C. suzukii*, from the South China Sea, off Taiwan, and Habe (1979) described *C. pagoda nakayasui* from the same area. The writer has examined specimens of these species from off Pratas Island

(Dongshe Qundo) (United States National Museum) and off Da Nang, Vietnam (Zoological Museum, Copenhagen), which extend the ranges even further south. These specimens, and those illustrated by Habe (1979) from the South China Sea, show that *C. pagoda nakayasui* bears a very close resemblance to the east Australian species *C. hedleyi* and that *C. suzukii* resembles *C. spinicinctum*, which suggests that there may be a closer relationship between the Southeast Asian and Australian species than has hitherto been accepted. This possibility needs to be investigated when further material is available.

As yet there are no records of species of *Columbarium* from the west coast of Australia (Harasewych 1986), but there is one record from the south coast. Unfortunately this record is of a single, small fragment dredged by *Endeavour* in 655 m, 120 miles west of Eucla, Western Australia (South Australian Museum, Verco Collection) and it is not possible to determine its relationship with other species.

With regard to the stratigraphic range of the genus, examination of an undoubted specimen of a species of *Columbarium*, somewhat similar to *C. rugatum* Aldrich (Early Eocene, U.S.A.), from the Pebble Point Formation near Princetown, Victoria, confirms the existence of the genus in the Paleocene of Australia. Also examination of a well-preserved specimen of *Fulgurofusus vulneratum* Finlay and Marwick (Paleocene) in the collection of the Geology Department, University of Otago has confirmed that this species is a *Columbarium* (Darragh 1969, p. 73). The genus was present, therefore, both in New Zealand and Australia at the beginning of the Tertiary.

Columbarium hystriculum sp. nov.

Figs 1, 3E-F, K-L

DESCRIPTION: Shell large (up to 100 mm), fusiform, with gradate spire of 8 prominently shouldered whorls with double spinose keel. Protoconch of about 2½ smooth whorls which merge gradually into teleoconch whorls, first whorl slightly deviated from axis of shell, attenuated to posteriorly-directed point; second whorl bearing weak median keel, which increases rapidly in strength into prominent keel bearing flat, close-set spikes open towards aperture.



Fig. 1—*Columbarium hystriculum* sp. nov., paratype, NMV F53054, $\times 14$.



Fig. 2—*Coluzea bimurata* sp. nov., AM C152079, $\times 28$.

Teleoconch of 7 to 8 whorls, smooth posterior to keel except for one very strong cord first appearing on first teleoconch whorl, set close to keel and bearing well-developed flat spikes similar to those of keel; strength of cord and position close to keel give shoulder periphery double-keeled appearance. Anterior whorl slope usually with one prominent spinose cord (rarely two), first appearing on second teleoconch whorl, situated midway between keel and anterior carina and on spire whorls visible immediately posterior to suture. Anterior earina situated at anterior third of slope, bearing fine imbricating scales.

Aperture subcircular; columella covered with prominent curved plate ending posteriorly against suture in notch. Outer lip smooth, produced into prominent point at position of anterior carina. Anterior canal about half length of shell and bearing widely-spaced spinose lirae.

Shell covered with a thin brown periostracum. Shell colour white with spiral sculpture coloured light brown. Operculum corneous, ovate with terminal nucleus.

MEASUREMENTS: All measurements are in millimetres and a standard set of measurements have been taken as follows: L, total length of specimen; LS length of specimen excluding canal; HA height of aperture measured parallel to the axis of the shell; W, width of the final whorl from edge to edge of the keel and not including projections such as spines or flanges.

Holotype F53049	L 95	LS 44	HA 13	W 23
Paratype F53054	64	30	8	17
Paratype C150611	70	48	9	19

LOCATION OF TYPES: Museum of Victoria—Natural History, Holotype NMV F53049, Paratype F53054 presented by Mrs M. Hagerty. Australian Museum Paratype C150611, presented by V. Vandenberg.

TYPE LOCALITY: NE of Townsville, 218-230 m, 17.57°-18.98°S, 146.82°-148.61°E.

DISTRIBUTION: East of Rockingham to east of Babinda North Queensland, 218-503 m.

MATERIAL: *Museum of Victoria*. E of Rockingham, Qld. 302-308 m, 18°00'S, 147°01'E-17°57'S 146°58'E, *Soela*, 9 January, 1986. 264 m, 18°00'S 147° 03'E-17°56'S 147°00'E, *Soela*, 10 January, 1986. 220 m 18°00'S 147°02'E-17°57'S 146°59'E, *Soela*, 9 January, 1986. 220-218 m, 17°59'S 147° 05'E-17°57'S 147°03'E, *Soela*, 11 January, 1986. *James Cook University, Marine Biology*. No. 491, *Cidarid* 1 Stn 46-3, 16 May 1986 295-309 m, 17°55.38'S 147°00.96'E, east of Tully, Qld No. 762, *Cidarid* 1 Stn 47-2, 16 May 1986, 503-497 m 17°51.76'S 147°07.95'E, east of Mission Beach, Qld. No. 895, *Cidarid* 1 Stn 42-3, 15 May 1986, 298-301 m 17°37.7'S 146°50.2'E, east of Double Point, Qld. No. 693 No. 812, *Cidarid* 1 Stn 42-2, 15 May 1986, 303-296 m 17°21.77'S 146°48.52'E, east of Babinda, Qld.

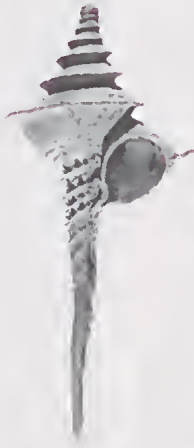
REMARKS: This species is closest to *Columbarium harrisa* Harasewych described from the area east of Lady Musgrave Island, central Queensland. *C. hystriculum* has a similar protoconch and is only slightly smaller in size. However, the spiral sculpture bears prominent spikes rather than scales. The most obvious difference is the possession of a double spinose keel, which also distinguishes it from other species in the genus.

Species of *Columbarium* usually have a first protoconch whorl which is smooth, globose and deviated perpendicular to the axis of the shell. This kind of protoconch is formed by calcification of a chitinous envelope of similar shape developed in the egg capsule. In the case of *C. hystriculum* and *C. harrisa*, calcification of the chitin has not taken place until the second whorl and the chitinous portion has been lost. The point at the beginning of the remaining protoconch represents portion of the columella of the original first whorl. Such deciduous protoconchs also occur in other groups, for example, in species of *Austrotriton* (Cymatiidae) and

Fig. 3—A-B, *Columbarium pagodoides* (Watson), AM C150610, $\times 1$. C-D, *Columbarium spinicinctum* (Martens), AM C151999, $\times 1$. E-F, *Columbarium hystriculum* sp. nov., paratype, NMV F53054, $\times 1$. G-H, *Columbarium pagodoides* (Watson), AM C116108, $\times 1$. I-J, *Columbarium harrisa* (Harasewych), AM C132220, $\times 1$. K-L, *Columbarium hystriculum* sp. nov., holotype, NMV F53049, $\times 1$.



A



B



C



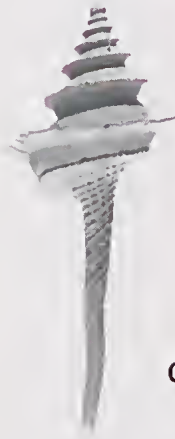
D



E



F



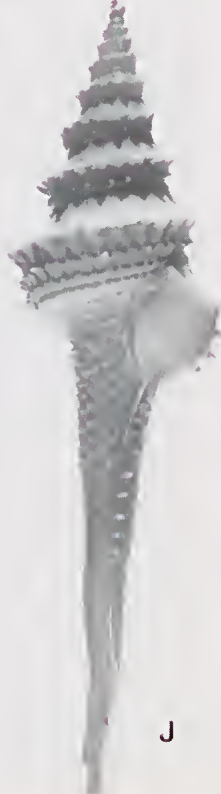
G



H



I



J



K



L

Spinomelon (Volutidae).

The material collected on *Soela* consists of 9 live-taken specimens now preserved in alcohol. Unfortunately, none are suitable for selection as types owing to partial dissolution of the early whorls in formalin used to fix them.

***Columbarium pagodoides* (Watson, 1882)**

Figs 3 A-B, G-H

Fusus (*Colus*) *pagodoides* Watson 1882 p. 383.

Columbarium pagodoides (Watson); Darragh 1969, p. 81, pl. 4, fig. 74, 76; fig. 19.

REMARKS: In 1969, only the original *Challenger* specimens were known to the writer. Since then, extensive trawling by the New South Wales State Fisheries Research Vessel *Kapala* has yielded many specimens from the east coast of New South Wales and other dredging further north has extended the range into North Queensland. T. Mortenson, on the Danish Kei Island Expedition (1922), also collected specimens in the northern Arafura Sea.

The additional material reveals that the spiral sculpture of the species is somewhat variable. Queensland specimens can have fine spiral threads between the keel and the anterior carina and between the carina and the canal.

The two specimens from the Kei Islands have well-spaced fine lirae anterior and posterior to the anterior carina. Queensland specimens are intermediate between these and the central New South Wales specimens which can be, but not always, devoid of any spiral sculpture on the anterior whorl slope of the body whorl apart from the anterior carina.

DISTRIBUTION: This species occurs on the continental shelf and slope in depths ranging from 250 to 969 m, but seems to be more common on the slope in depths over 400 m. The southernmost occurrence known is east of Batemans Bay, southern New South Wales. There is a good series of records as far north as east of the Gold Coast, south Queensland. There are several records between Tully and Cairns, north Queensland and two records in the Kei Islands. This range overlaps considerably that of *C. hedleyi*, but *C. pagodoides* tends to occur further offshore in deeper water of the continental slope.

MATERIAL EXAMINED: *Australian Museum*. C105420 E of Brushy Is. N.S.W., 549 m, 35°44-40'S 150° 38-41'E, *Kapala*, 24 Nov. 1976. Southeast of Ulladulla, N.S.W., 440 m, 35°29-25'S 150°47-50'E, *Kapala*, 16 Dec. 1975. Off Nowra, N.S.W., 814 m, 34°50'S 151°15'E, *Kapala*, 12 Dec. 1975. C100855, 32 km east of Kiama, N.S.W., 503 m, 34° 36-45'S 151°16-13'E, *Kapala* 21 Aug. 1975. C79192, E of Broken Bay N.S.W., 550 m, 33°34'S 152°03'E, *Kapala*, 21 April 1971. C120411, off Port Stephens, N.S.W., 550 m, 32°50'52'S 152°42-41'E, *Kapala*, 6 Dec. 1978. C79200, off Newcastle, N.S.W., 340-550 m, 32°46', 33°15'S-152°16', 152°46'S, *Kapala*, 5-12 May, 1971. ENE of Clarence River, N.S.W., 457 m, 29°26'S 153°49'E-29°20'S, 153°36'E, *Kapala*, 12 Oct. 1975. C101614 NE of North Solitary Is. N.S.W., 503 m, 29°52'S 153°45'E-29°46'S, 153°45'E, *Kapala*, 10 Oct.

1975. C116121, off Tweed Heads, N.S.W., 412 m, 28°06'S 153°58'E, *Kapala*, 12 June, 1978. C115265, SE of Coolangatta, Qld, 412 m, 28°03'S, 153°58'E, *Kapala*, 17 Aug. 1978. C116108, E of Gold Coast, Qld, 550 m, 28°02-27°59'S, 153°59'E, *Kapala*, 2 June, 1978. C150610, off Cairns, Qld, 668-613 m, 17°10'S 146°42'E, *Kapala*, 13 Oct. 1981. *James Cook University, Marine Biology*. No. 521, *Cidaris 1* Stn 1-3, 6 May 1986, 956-969 m, 18°7.87'S 147°35.7'E, north east of Myrmidon Reef. No. 899, *Cidaris 1* Stn 50-3, 17 May 1986, 918-891 m. 18°01.69'S 147°20.53'E, north east of Pith Reef. No. 900, 902, *Cidaris 1* Stn 47-2, 16 May 1986, 503-497 m, 17°51.76'S 147°7.95'E, east of Tully, Qld. No. 639, *Cidaris 1* Stn 49-3, 17 May 1986, 920-881 m, 17°51.71'S 147 09.93'E, east of Tully, Qld. No. 622, *Cidaris 1* Stn 48-2, 17 May 1986, 703 m, 17°50.67'S 147°18.16'E, east of Tully, Qld. No. 740, *Cidaris 1* Stn 43-2, 15 May 1986, 458-500 m, 17°34.58'S 147°53.21'E, east of Innisfail, Qld. *Zoological Museum, Copenhagen*. Station 28, Danish Expedition to Kei Islands, 17 April 1922, 400 m, between Kei-Doelah and Kei Besar. Station 56, Danish Expedition to Kei Islands, 10 May 1922, T. Mortenson, 345 m, off West coast of Kei Besar, 5°30'20"S 132°51'E.

***Columbarium spinicinctum* (Martens, 1881)**

Figs 3 C-D, 4 K, M

Pleurotoma (*Columbarium*) *spinicincta* Martens 1881, p. 105, pl. 21, figs 1-3.

Columbarium spinicinctum (Martens); Darragh 1969, p. 84, pl. 2, fig. 22-23; pl. 4, fig. 59, 63, 66, 68; fig. 15. REMARKS: In 1969 this species had only been collected in the vicinity of the type locality off Cape Morton, Queensland. Dredging on FRV *Kapala*, *Cidaris 1* and HMAS *Kimbla* has extended the known range considerably to the north and south. The southern part of its range overlaps that of *C. pagodoides*, but *C. spinicinctum* occurs closer inshore on the shelf in shallower water than the former.

DISTRIBUTION: East of Nambucca Heads, northern New South Wales to east of Babinda, north Queensland, 115-300 m.

MATERIAL EXAMINED: *Australian Museum*. C116339, NE of Smoky Cape, N.S.W., 134-152 m, 30°43-40'S 153°16-17'E, *Kapala*, 1978. C116428, E of North Solitary Island, N.S.W., 143 m, 29°47-50'S 153°39-38'E, *Kapala*, 1 Aug. 1978. C120391, E of Brunswick Heads, N.S.W., 119 m, 28°25-29'S 153°48-49'E, *Kapala*, 3 June, 1978. C116115, E of Tweed Heads, N.S.W., 146 m, 28°16-12'S 153°50-51'E, *Kapala*, 2 June, 1978. East of Tweed Heads, N.S.W., 152-155 m, 28°12-19'S 153°50'E, *Kapala*, 3 June, 1978. C117808, off Point Danger, N.S.W., 134 m, 28°13-18'S 153°50'E, *Kapala*, 6 Nov. 1978. C115240, E of Tweed Heads, N.S.W., 146 m, 28°14-11'S 153°50'E, *Kapala*, 15 Aug. 1978. C114343, E of Point Danger, N.S.W., 172 m, 29°12-14'S 153°50-51'E, *Kapala*, 17 Aug. 1978. Off S. end of Fraser Is., Qld, 201 m, 25°57-8'S 153°51'E, *Kimbla*, 10 Nov. 1978. Off S. end of Fraser Is., Qld, 210-219 m, 25°59'S 153°51'E, *Kimbla*, 10 Nov. 1976. C151998, E of Lady Elliot Is., Qld, 220-230 m, 24°07'S

152°53'E, *Kimbla*, 7 July 1984. C151999, E of Lady Musgrave Is., Qld, 296 m, 23°53-52'S 152°43-42'E, *Kimbla*, 7 July 1984. C152009, c. 25 miles E of Lady Musgrave Is., Qld, 348-357 m, 23°44'S 152°49'E, *Kimbla*, 17 Nov. 1977. C152002, NE of Lady Musgrave Is., Qld, 365 m, 23°39'S 152°46'E, *Kimbla*, 14 Dec. 1977. C152004, E of North West Is., Qld, 320 m, 23°20'S 152°35'E, *Kimbla*, 14 Dec. 1977. C152008, Capricorn Channel, Qld, 155 m, 23°09'S 152°17'E, *Kimbla*, 14 Dec. 1977. *James Cook University, Marine Biology*. No. 509, *Cidaris 1* Stn 46-2, 16 May 1986, 287-300 m, 17°52.06'S 147°02.48'S, east of Tully, Qld. No. 692, *Cidaris 1* Stn 42-2, 15 May 1986, 303-296 m, 17°21.77'S 146°48.52'E, east of Babinda, Qld.

Columbarium harrisae Harasewych, 1983

Figs 3 1-J

Columbarium harrisae Harasewych 1983a, p. 29 (Figs 1-4).

REMARKS: This species was originally recorded from 275 metres, east of Lady Musgrave Island, Queensland. Numerous specimens have been dredged by trawlers from the same area and also from east of Lady Elliot Island in 220 metres, but no specimens have yet been collected by any scientific research vessel working in this or any other area.

Columbarium hedleyi Iredale, 1936

Figs 4 A-B

Columbarium hedleyi Iredale 1936, p. 316, pl. 24, fig. 18, 18a.

Columbarium trabeatum Iredale 1936, p. 316, pl. 23, fig. 17.

Columbarium hedleyi Iredale; Darragh 1969, p. 81, pl. 4, fig. 65, 69-72, 78; fig. 8.

REMARKS: In 1969 this species had only been collected from east of Twofold Bay as far north as east of Broken Bay, New South Wales. Trawling by FRV *Kapala* has extended this range to northern New South Wales and trawling by RV *Cidaris 1* has produced a series of specimens from off north Queensland between east of Mission Beach and Innisfail; a considerable extension of the range of the species to the north. There are no records between those of northern Queensland and northern New South Wales. However, this is probably a reflection of inadequate sampling rather than evidence for a disjunct range. The eleven north Queensland specimens are somewhat smaller (28-31 mm) than those from New South Wales (39-75 mm), but otherwise are similar in protoconch and shell shape and sculpture.

The northern part of the range of *C. hedleyi* overlaps that of *C. spinicinctum*, but the former seems to be in deeper water than the latter.

DISTRIBUTION: Southeast of Gabo Island, Victoria to east of Innisfail, north Queensland, 157-640 m (most common under 400 m).

MATERIAL EXAMINED: *Museum of Victoria*. 501/85 *Soela* Stn 45, 4 February 1985, 458 m, 37° 41.5'S 150° 14'E to 37° 45.1'S 150° 15.2'E, 55 km E of Gabo Is., Vic. *Australian Museum*. C110743, SE of Gabo Is., Vic. 640 m,

37°43-40'S 150°17'E, *Kapala*, 30 Nov. 1977. C110742, SE of Gabo Is., Vic. 457 m, 37°43-45'S 150°14-15'E, *Kapala*, 29 Nov. 1977. C110712, SE of Eden, N.S.W., 330 m, 37°15-13'S 150°21'E, *Kapala*, 12 Oct. 1977. C102820, E of Bermagui, N.S.W., 354-383 m, 36°27-21'S 150°19-21'E, *Kapala*, 22 July 1975. C105417 E of Brush Is., N.S.W., 439 m, 35°31.36'S 150°46-43'E, *Kapala*, 24 Nov. 1976. C123347, off Sydney, N.S.W., 450-457 m, 33°42-39'S 151°51-53'E, *Kapala*, 5 Dec. 1979. C125569, E of Cape 3 Points, N.S.W., 457-476 m, 33°28-29'S 151°52'E, *Kapala*, 5 Dec. 1979. C117820, off Port Stephens, N.S.W., 274 m, 32°50-49'S 152°41-42', *Kapala*, 6 Dec. 1978. C73915, E of Port Macquarie, N.S.W., 292-310 m, 31°18'S 153°19'E, BMR, Sept. 1969. N.E. of Woolgoolga, N.S.W., 165 m, 29°44-50'S 153°41-49'E, *Kapala*, 11 Oct. 1978. *James Cook University, Marine Biology*. No. 767, 903, 907, *Cidaris 1* Stn 47-2, 16 May 1986, 503-497 m, 17°51.76'S 147°07.95'E, east of Mission Beach, Qld. No. 741, *Cidaris 1* Stn 43-2, 15 May 1986, 458-500 m, 17°34.58'S 146°53.21'E, east of Innisfail, Qld.

Genus *Coluzea* Finlay, 1926

Coluzea Finlay in Allan 1926, p. 304.

Coluzea Finlay; Darragh 1969, p. 104.

Coluzea Allan; Harasewych 1986, p. 158.

Harasewich (1986) has pointed out that *Coluzea* and *Fulgurofusus* are close to one another both in shell and radular morphology and the material reported here certainly adds weight to the possibility that the two may be synonyms. However, the author follows Harasewych (1986) in retaining *Coluzea* until such time as a comprehensive revision, based on anatomical data, can be undertaken.

The genus is known to occur in the Indian Ocean off the south and east coasts of Africa, off north west Australia, off Thailand and in the Makassan Strait, in the Western Pacific Ocean off the north east coast of Australia, off New Caledonia and off New Zealand (Darragh 1969, Harasewych 1986).

Coluzea icarus Harasewych, 1986

Figs 4 G-H

Coluzea icarus Harasewych 1986, p. 163, pl. 2, fig. 1-2; pl. 3, fig. 2.

REMARKS: This species was originally described from the upper continental slope of Western Australia. Two additional records from that area are added here, as well as one record extending the distribution easterly to north Queensland. The single Queensland specimen closely resembles the Western Australian specimens, but the spiral threads are a little coarser and spiral threads are present on the posterior whorl slope of the body whorl, whereas these are only present on the earlier spire whorls of the Western Australian specimens. Such variations of sculptural development are to be expected and these differences are not considered to be of significance.

DISTRIBUTION: Northwest of Port Hedland, Western Aus-



tralia to west of Cape Bougainville, Western Australia; off Raine Island, Queensland. 420-592 m.

MATERIAL EXAMINED: *Western Australian Museum*. WAM 927-85, 285 km northwest of Port Hedland, W.A. WAM 1611-84, northwest of Beagle Bay, W.A. *Australian Museum*. C152011, 200 km, NNW of Dampier, northwest Australia, 450 m, 18°53'S 116°10'E, *Soela*, 30 Jan. 1984. C143134, SW of Scott Reef, northwest Australia, 500 m, 14°39'S 121°29'E, *Soela*, 11 Feb. 1984. C130391, 3-8 km, ENE of Raine Island, Qld, 420 m, 11°35'S 144°04'E Station INQ 79-32, 12 Feb. 1979.

Coluzea bimurata sp. nov.

Figs 2, 4 C-D, F, J, L-P

DESCRIPTION: Shell fusiform, elongate, narrow, of small size (to 37 mm) generally with canaliculate suture and with prominent serrate keel; body whorl with 10-19 sharp keel spikes. Protoconch of two whorls; first whorl glassy, smooth, deviated at right angles to axis of shell; second whorl with weak keel and merging gradually with teleoconch whorls; keel at first nodulate then serrate as keel increases in strength on subsequent whorls.

Teleoconch of 8 to 9 whorls; axial sculpture of very weak folds, close to keel, corresponding to keel serrae, obsolete on adult whorls, spiral sculpture on posterior whorl slope beginning on second teleoconch whorl, consisting of 2 or 3 well-spaced lirae; posterior lira situated at posterior third, usually increasing in strength into erect flange, forming anterior wall of deep sutural channel. Channel usually with 2 or 3 weak spiral threads on body whorl. On some specimens flange sculptured with 2 or 3 spiral threads. Anterior to channel flange, usually another weaker flange and one fine to coarse lira close to keel. Anterior whorl slope of spire whorls with 1 to 3 lirae of varying strength, usually one matching in strength its pair immediately posterior to keel. Anterior whorl slope of final whorl regularly convex with 5 to 6 well-developed lirae with interspaces of about same width as lirae. Fine threads inserted between lirae on some specimens. Lirae continuing on to canal and decreasing in strength anteriorly.

Aperture ovate, inner lip smooth, covered with thin glaze. Canal long, straight, about one third length of shell. Shell covered with straw coloured periostracum. Operculum corneus with terminal nucleus.

MEASUREMENTS:

Holotype C152007b	L 34	LS 19	HA 5	W 9.0
Paratype C152007a	37	21	ca 5	9.0
Paratype C152000	25	16	4.5	7.0
JCU 508	22	13	3	6.5

LOCATION OF TYPES: Australian Museum, Sydney. Holotype and Paratype C152007, collected W. F. Ponder, I. Loch and P. Terrill, 14 Dec. 1977 on HMAS *Kimbla*. Paratype C152000, collected P. H. Colman, 7 July, 1984.

TYPE LOCALITY: Capricorn Channel, Queensland, 155 m, 23°08.6'S 152°16.6'E *Kimbla* Station 21.

DISTRIBUTION: North of Fraser Island, Queensland to Swain Reefs, 155-365 m.

MATERIAL EXAMINED: *Australian Museum*. C152003, 32 km N of Fraser Is., Qld, 229-192 m, 24°22.5'S 153°17.1'E, *Kimbla* Stn 25, 15 Dec. 1977. C152000, E of Lady Musgrave Is., Qld, 296 m, 23°52.5-51.9'S 152°42.7-41.7'E, *Kimbla* Stn 15, 7 July 1984. C152001, NE of Lady Musgrave Is., Qld, 365 m, 23°38.8'S 152°45.5'E, *Kimbla* Stn 24, 14 Dec. 1977. C162005, E of North West Is., Qld, 320 m, 23°19.5'S 152°35.4'E, *Kimbla* Stn 23, 14 Dec. 1977. C152006, E of North West Is., Qld, 284 m, 23°15.2'S 152°24.1'E, *Kimbla* Stn 22, 14 Dec. 1977. C152007, Capricorn Channel, Qld, 155 m, 23°08.6'S 152°16.6'E, *Kimbla* Stn 21, 14 Dec. 1977. C152078-79, SE of Swain Reefs, Qld. 187 m, 22°26.27-20.2'S 153°17.13-6'E, *Kimbla* Stn 7, 5 July, 1984. *James Cook University Marine Biology*. No. 508, *Cidaris* 1 Stn 46-2, 16 May 1986, 287-300 m, 17°52.06'S 147°02.48'E, east of Tully, Qld. No. 694, *Cidaris* 1 Stn 42-2, 15 May 1986, 303-296 m, 17°21.77'S 147°02.48'E, east of Babinda, Qld.

REMARKS: In general shape this species is somewhat similar to *C. dentata* (Hutton), but the axial sculpture is less prominent and is separated most obviously by the channelled suture bounded by the prominent flanges on the posterior whorl slope, a feature which also separates it from all living species. The north Queensland specimens have a sculptural pattern similar to the central Queensland specimens, but the lirae on the posterior whorl slope are not so obviously produced into flanges as on the latter and, therefore, the suture is only very weakly, if at all, canaliculate.

Coluzea picicola sp. nov.

Figs 4 E-I

DESCRIPTION: Shell lanceolate, very elongate, small (21 mm) with canaliculate suture and tuberculate keel; body whorl with 12 tubercles. Protoconch of about 1½ smooth whorls, first whorl globose, deviated at right angles to axis of shell, second whorl with weak keel developed and merging into teleoconch whorls, keel tuberculate and rapidly increasing in strength.

Teleoconch of six whorls with prominent keel situated at anterior two-thirds of spire whorl. Axial sculpture of weak folds, strongest closest to keel, tuberculate on keel and where crossed by spiral sculpture. Spiral sculpture on posterior whorl slope initially of 4 lirae increasing to 6 by insertion of finer threads between lirae, posterior lira strongest and well separated from suture forming channelled suture. Anterior whorl slope of spire with 3 widely-spaced lirae, central lira strongest, somewhat tuberculate on axial sculpture. Body whorl with 8-10 lirae alternatively weak and strong.

Fig. 4—A-B, *Columbarium hedleyi* Iredale, JCU907, ×2.7. C-D, *Coluzea bimurata* sp. nov. paratype, AM C152000, ×3. E, I, *Coluzea picicola* sp. nov., holotype, AM C82163, ×3. F, J, *Coluzea bimurata* sp. nov., paratype, AM C152007a, ×2. G-H, *Coluzea icarus* Harasewych, AM C130391, ×1. K, M, *Columbarium spinicinctum* (Martens), JCU692, ×2.3. L, N, *Coluzea bimurata* sp. nov., holotype, AM C152007b, ×2. O-P, *Coluzea bimurata* sp. nov., JCU508, ×3.5.

Aperture ovate, inner lip smooth, covered with thin glaze. Canal long, straight, about one-third length of shell, bearing close set, fine lirae somewhat weaker in strength than those of body whorl.

MEASUREMENTS: Holotype C82163 L 21 LS 13.5 HA 3.5 W 15.

LOCATION OF TYPE: Australian Museum, Sydney, Holotype C82163, collected P. Colman on *Kimbla*, 8 May, 1971.

TYPE LOCALITY: South of Ile des Pins, New Caledonia, 370 m, 22°52'S 167°35.5'E, *Kimbla* Stn K4-71-2.

DISTRIBUTION: South of New Caledonia, off the Isle of Pins, 275-370 m.

MATERIAL EXAMINED: Holotype; C152010, 6.4 km S of Ile des Pins, New Caledonia, 275 m, 22°50'S 167°34'E, 8 May 1971, *Kimbla* Stn K4-71-3.

REMARKS: In general shape and appearance this species is very close to the New Zealand Miocene fossil species *C. dentata* (Hutton) and *C. paucispinosa* Finlay. However, the whorls are more rounded, it has more lirae, more numerous tubercles on the keel, the radial sculpture is not as prominent and the suture is channelled. In possessing a channelled suture the new species has some resemblance to *C. bimurata* sp. nov., but it has flattened tubercles rather than spikes on the keel and has radial sculpture, which is entirely lacking on *C. bimurata*.

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